

BBNA Tribal Energy Efficiency & Conservation Block Grant Program

Administered by Alaska Building Science Network

Twin Hills Final Report



Community Summary

Five (5) community buildings owned by the Twin Hills Village Council and 29 Tribal Member households received energy efficient lighting and weatherization upgrades:

Old Clinic
Power House
New Clinic
Tribal Office
Water Treatment Plant
Tribal Member Homes

Retrofits Completed: August 2012

Village-Wide Energy Efficient Lighting and Weatherization Retrofit Summary:

• Projected Annual Electrical Savings (kWh):	11,700
• Projected Annual Electrical Cost Savings:	\$6,550 ^{1,2}
• Projected Annual Heating Fuel Savings (gallons):	935
• Projected Annual Fuel Cost Savings:	\$5,591 ³
• Total Projected Annual Energy Cost Savings:	\$12,141
• Total village-wide In-kind contributions:	\$4,539
• Total project cost including In-kind contributions:	\$36,200
• Simple Payback (including In-kind contributions):	2.98 years

¹ kWh Rate [used to calculate electrical cost savings] for Weatherization & Heating Measures (AkWarm Library): \$0.55

² kWh Rate [used to calculate electrical cost savings] for Lighting Measures (State of AK - AEA PCE Program Report FY 2011 avg.): \$0.56

³ #2 Heating Fuel Rate [used to calculate heating fuel savings] (AkWarm Library): \$5.98/gal

Old Clinic

Lighting Retrofit Summary:



Materials Installed

Fluorescent 4-lamp electronic ballast, (4) 25 watt T8 lamps

Quantity

1

- | | |
|---|------------|
| • Pre-retrofit energy use: | 0.144 kW |
| • Post-retrofit energy use: | 0.090 kW |
| • Energy savings projection: | 0.054 kW |
| • Pre-retrofit to post retrofit energy reduction: | 38 percent |
| • Estimated Annual Savings: | 95 kWh |

Hours/day (250 days/year)	Electrical Savings (\$)	Avoided Diesel (gal)	Avoided Diesel (\$)
4 Hours/day	\$30.22	4.36	\$16.87
7 Hours/day	\$52.89	7.63	\$29.52
10 Hours/day	\$75.56	10.90	\$42.17
2,000 Hours/year	\$60.45	8.72	\$33.73

Power House

Lighting Retrofit Summary:



Materials Installed

Fluorescent 2-lamp electronic ballast, (2) 25 watt T8 lamps

Quantity

4

- | | |
|---|------------|
| • Pre-retrofit energy use: | 0.336 kW |
| • Post-retrofit energy use: | 0.184 kW |
| • Energy savings projection: | 0.152 kW |
| • Pre-retrofit to post retrofit energy reduction: | 45 percent |
| • Estimated Annual Savings: | 266 kWh |

Hours/day (250 days/year)	Electrical Savings (\$)	Avoided Diesel (gal)	Avoided Diesel (\$)
4 Hours/day	\$85.07	12.27	\$47.48
7 Hours/day	\$148.88	21.47	\$83.08
10 Hours/day	\$212.69	30.67	\$118.69
2,000 Hours/year	\$170.15	24.54	\$94.96

New Clinic**Weatherization Retrofit Summary:****Materials Installed**

Programmable thermostats

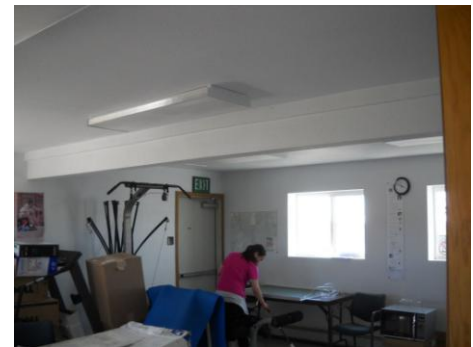
Quantity

4

• Pre-retrofit energy use:	700 gallons
• Post-retrofit energy use:	668 gallons
• Annual energy savings projection:	32 gallons
• Pre-retrofit to post retrofit energy reduction:	5% (Fuel)
• Estimated Annual Heating Fuel Cost Savings:	\$191.36

Tribal Office**Total Building Savings All Measures:**

- Projected Annual Electrical Savings (kWh): 5,847
- Projected Annual Electrical Cost Savings: \$3,272
- Projected Annual Heating Fuel Savings (Gallons): 555
- Projected Annual Fuel Cost Savings: \$3,319
- Total Projected Annual Energy Cost Savings: \$6,591

Lighting Retrofit Summary:**Materials Installed****Quantity**

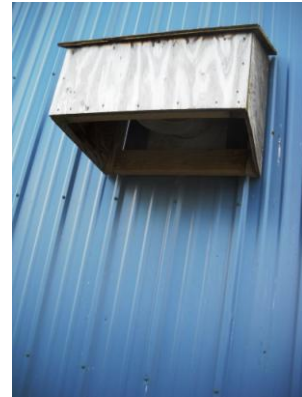
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|---|----|
| Fluorescent 2-lamp electronic ballast, (2) 25 watt T8 lamps | 4 |
| Fluorescent 4-lamp electronic ballast, (3) 25 watt T8 lamps | 9 |
| Fluorescent 4-lamp electronic ballast, (4) 25 watt T8 lamps | 25 |

- | | |
|---|------------|
| • Pre-retrofit energy use: | 6.384 kW |
| • Post-retrofit energy use: | 3.109 kW |
| • Energy savings projection: | 3.275 kW |
| • Pre-retrofit to post retrofit energy reduction: | 51 percent |
| • Estimated Annual Savings: | 5,731 kWh |

Hours/day (250 days/year)	Electrical Savings (\$)	Avoided Diesel (gal)	Avoided Diesel (\$)
4 Hours/day	\$1,833.02	264.33	\$1,022.94
7 Hours/day	\$3,207.78	462.57	\$1,790.15
10 Hours/day	\$4,582.54	660.82	\$2,557.35
2,000 Hours/year	\$3,666.04	528.65	\$2,045.88

Tribal Office

Weatherization Retrofit Summary:



Materials Installed

Added ventilation contingency (exhaust only)

Added fiberglass batt insulation to perimeter of crawlspace

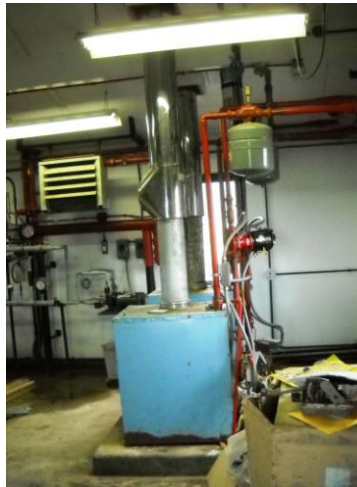
• Pre-retrofit energy use:	1,696 gallons / 356 kWh
• Post-retrofit energy use:	1,141 gallons / 240 kWh
• Annual energy savings projection:	555 gallons / 116 kWh
• Pre-retrofit to post retrofit energy reduction:	33% (Fuel) / 33% (Electricity)
• Estimated Annual Heating Fuel Cost Savings:	\$3,318.90
• Estimated Annual Electrical Cost Savings:	\$63.80

Water Treatment Plant

Total Building Savings All Measures:

- Projected Annual Electrical Savings (kWh): 670
- Projected Annual Electrical Cost Savings: \$374
- Projected Annual Heating Fuel Savings (Gallons): 348
- Projected Annual Fuel Cost Savings: \$2,081
- Total Projected Annual Energy Cost Savings: \$2,455

Lighting Retrofit Summary:



Materials Installed

Fluorescent 2-lamp electronic ballast, (2) 25 watt T8 lamps

Quantity

9

- Pre-retrofit energy use: 0.756 kW
- Post-retrofit energy use: 0.414 kW
- Energy savings projection: 0.342 kW
- Pre-retrofit to post retrofit energy reduction: 45 percent
- Estimated Annual savings: 599 kWh

Hours/day (250 days/year)	Electrical Savings (\$)	Avoided Diesel (gal)	Avoided Diesel (\$)
4 Hours/day	\$181.42	27.60	\$106.82
7 Hours/day	\$334.98	48.31	\$186.94
10 Hours/day	\$478.54	69.01	\$267.06
1,800 Hours/year	\$344.55	49.69	\$192.28

Water Treatment Plant

Weatherization Retrofit Summary:



Materials Installed

Programmable thermostat
Caulking and sealing to reduce air leakage
Added mechanical ventilation

Quantity

1

• Pre-retrofit energy use:	627 gallons / 167 kWh
• Post-retrofit energy use:	279 gallons / 96 kWh
• Annual energy savings projection:	348 gallons / 71 kWh
• Pre-retrofit to post retrofit energy reduction:	56% (Fuel) / 43% (Electricity)
• Estimated Annual Heating Fuel Cost Savings:	\$2,081.04
• Estimated Annual Electrical Cost Savings:	\$39.05

9 Households LED A19 Bulbs

Lighting Retrofit Summary:



Materials Installed

LED A19 bulb – 7 watt

Quantity

52

• Pre-retrofit energy use:	3.120 kW
• Post-retrofit energy use:	0.364 kW
• Energy savings projection:	2.756 kW
• Pre-retrofit to post retrofit energy reduction:	88 percent
• Estimated annual savings:	4,823 kWh

Hours/day (250 days/year)	Electrical Savings (\$)	Avoided Diesel (gal)	Avoided Diesel (\$)
4 Hours/day	\$1,542.53	222.44	\$860.83
7 Hours/day	\$2,699.43	556.09	\$1,506.46
10 Hours/day	\$3,856.33	556.09	\$2,152.08
1,750 Hours/year	\$2,699.43	389.27	\$1,506.46

The **LED “A19”** screw-in style light bulb is among the latest technologies available for lighting energy efficiency. The bulb utilizes Light Emitting Diode (LED) technology which operates more efficiently than the standard Incandescent bulb or spiral-type Compact Fluorescent bulb (CFL). This “60 watt equivalent” LED A19 bulb uses **8 watts** to produce the same light output (lumens) as a **60 watt** incandescent bulb. This particular LED A19 also lasts up to 50,000 hours versus average 8,000 hours for a Compact Fluorescent bulb. In addition, this “outdoor rated” version will operate both in wet and cold weather conditions and will not struggle to turn on in winter.